There's an app feature for that: Establishing user preferred mobile app features through asynchronous online interviews

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Abstract

A mobile application's (app) popularity and influence is determined by its users. These users download, use, review and support an app based on a myriad of requirements and needs. The aim of this paper is to showcase the results from asynchronous online interviews, which was focused on exploring the needs of potential users of a mobile blood donation app in South Africa.

This paper specifically reports on the results of the 89 interviews conducted with existing and potential blood donors in South Africa during late 2017 and early 2018. As part of a larger, exploratory sequential mixed method research project, the interview schedule described in this paper was guided by the Leximancer analyses of app store reviews of existing blood donation apps, and the results from the interview informed a quantitative questionnaire.

The results of the interviews, garnered from a Leximancer analyses, showed that the potential convenience afforded to blood donors by a blood donation app was important – aspects such as reminders to donate and GPS functionality for finding blood donation events, among others, were mentioned as preferred features by respondents. Furthermore, several respondents noted that a question and answer feature with the blood donation organisation would be a value adding feature in an app of this kind.

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1 Introduction

Less than 1% of South Africans are active blood donors, placing immense pressure on the country's blood stocks which, at the worst of times, can only sustain demand for two days (Payi, 2018). An intervention in the blood donation habits of South Africans is necessary if this social problem is to be alleviated. Mobile applications (apps) have the potential for "incredibly high reach" (Zhao, Freeman & Li, 2016) and this is no more true than in South Africa, where smartphone penetration is now estimated at over 80% of the population (Independent Communications Authority of South Africa, 2019:25).

There are two blood service organisations in South Africa; one serves the Western Cape of South Africa, and the other serves the remaining eight provinces (South African National Blood Service, 2019; Western Cape Blood Service, 2019). Both organisations have existing mobile apps, however downloads of these apps are not high and only one of the two apps, the one representing the smaller of the two organisations, offers advanced features such as alerts and map navigation. Despite the existence of these apps, there is still a dire need for increased blood donation in the country. Considering the potential power of mobile blood donation apps in creating real-world change (Ouhbi, Fernández-Alemán, Toval, Idri & Pozo, 2015:52; Yuan, Chang, Uyeno, Almquist & Wang, 2016:619), it is prudent to explore what the users of such an app expect from such a technology. To that end, this research aimed to independently explore which mobile app features existing and potential blood donors in South Africa would prefer in a mobile blood donation app.

2 Designing for user experience

Most industries have been influenced by the rapid rise in smart phone technology adoption, especially in terms of engagement through mobile apps (Fang, Zhao, Wen & Wang, 2017:269; Kim & Baek, 2018:148; Tarute Nikou & Gatautis, 2017:145). Echoing this sentiment, Gartner states that "mobile apps are projected to have the most impact on business success by 2020" (Costello, 2019). In the space of mobile engagement through apps, Kulta and Karjuluoto (2016:174) state that "engagement can be created through a set of interactive experiences that meet customer values" and that it is necessary for users to interact meaningfully with the technology to create valuable engagement.

To ensure meaningful and valuable engagement, an app such as the one anticipated in this research, should be designed with the specific landscape that it aims to influence in mind (Potgieter & Rensleigh, 2018:301; Short, Rebar, Plotnikoff & Vandelanotte, 2015:33). Milward, Khadjesari, Fincham-Campbell, Deluca, Watson and Drummond (2016) suggest that the feature preferences of users could be the key to such increased engagement, through user-centered design; this supports the focus of this research on user-preferred features of a mobile blood donation app. Ultimately, the opinions of the app users regarding the usefulness of an app will determine whether the app will be used for its intended purpose (Soegaard, 2018:5); the purpose in the case of the app proposed in this research, is for it to potentially act as a catalyst for increased blood donation.

3 Study design

The philosophical paradigm in which this research was conducted, is defined as pragmatism. Pragmatism was the appropriate paradigm for this research, since the overarching research approach of the larger study was a sequential, mixed method approach, thereby "using pluralistic

approaches to derive knowledge about the problem" (Creswell, 2014:11). The findings of this paper report on a mono-method, qualitative methodological tool, in the form of asynchronous online interviews. The interview schedule was informed by an analysis of app store reviews of mobile blood donation apps, as reported by Potgieter and Rensleigh (2018).

The overarching research strategy for the study was design science research, with a specific focus on the awareness of a problem (the lack of blood donation in South Africa), a suggestion of a possible solution (the use of a user-centric mobile blood donation app to potentially act as a catalyst for increased user engagement and blood donation) and the development of artefacts in the form of constructs, design principles, and instantiations guiding user-preferred features for the envisioned app (Vaishnavi & Kuechler, 2015:14-16; Vaishnavi, Kuechler, & Petter, 2017:14).

The researchers remind the reader that the research presented in this paper forms part of a larger study, and that the final anticipated artefacts will not be presented here, as these products will be the accrued outputs of the entire study. Rather, the findings of this specific part of the sequential study informed a quantitative survey tool, the next stage of the larger sequential study. This paper reports on the most notable findings of the interviews conducted in this qualitative phase of data collection and analysis; these findings proved the most informative in the development of the quantitative survey tool which followed this qualitative phase of data collection.

4 Study methodology

The data collection for the research presented in this paper was administrated by iFeedback, a data solutions company with access to South African consumers through two respondent databases (iFeedback, 2019). The asynchronous online interview was conducted using an email invitation for respondents to answer the interview questions on iFeedback's data collection platform (Salmons, 2016:45). See Appendix 1 for the Interview Schedule.

The email invitation was sent to 11 369 South African consumers of various demographic and socio-economic backgrounds. The researchers collected 89 usable interview responses which, per Saunders, Lewis and Thornhill (2012:283), is sufficient for a qualitative study of this nature. Kumar (2014:228) concurs and states that, in qualitative sampling sample size does not necessarily play a significant role as the researcher is aiming at gaining in-depth knowledge about a specific issue and that generalising results is not the goal.

Regarding the judgement of the research, the researchers will report on four criteria concerning the reliability of qualitative research (Kumar, 2014:219; Lichtman, 2014:195):

- **Credibility** refers to a continuous engagement with research participants, by disclosing the research findings to those who have participated. This paper, as well as the final publication of the overarching study, will serve as the disclosure of the research findings. Respondents were informed of the nature of the study, and were also informed of the publication of the results.
- **Transferability** notes that, since qualitative research does not attempt to generalise findings, the process that was followed to obtain the results should be described in detail for others to follow and replicate. By publishing the research methodology, the researchers encourage transferability.

- **Dependability** takes into consideration the accuracy of the transcripts. Since respondents typed their answers, and those answers were used verbatim during data analysis, the text was analysed in its original form, and had not been edited in any way, other than file format, by the researchers.
- **Confirmability** addresses "investigator bias", where it is expected that the results can be traced back to the raw data. The researchers used Leximancer, a natural language analysis tool to analyse the raw data. Considering the various functionalities of this software, every finding can be traced back to the raw data, as will be explained in the discussion of Leximancer.

Data analysis was executed using Leximancer, an online platform that "processes natural language through a Bayes-inspired algorithmic process to model major thematic and conceptual content from an input text" (Sloan & Quan-Haase, 2017:532). An advantage of using Leximancer is that researcher bias and human error is avoided, as themes that may have been overlooked by researchers that code manually, will arise from the data through the application of the algorithm (Crofts & Bisman, 2010:188).

Leximancer conducts a conceptual analysis of the data, which determines the frequency of concepts (word or phrases), while also generating a relation analysis of the most prominent themes to each other (Leximancer, 2017:8). Leximancer dynamically establishes concepts by identifying 'seed words' and categorises these seed words as more or less relevant to the definition of a concept, depending on their prevalence during analysis (Leximancer, 2017:9). Themes are represented by coloured spheres, which are heat-mapped "to indicate importance" (Leximancer, 2017:12).

4.1 Analysis of data

To report on the findings effectively, the functionality of Leximancer will be briefly explained before the discussion of the results will ensue in detail. Figure 1 below shows the Leximancer concept map of the response to Question 4 of the interview. Leximancer uses colour coding to display the importance of themes, with the most important theme appearing in red, followed by orange, and gradually "cooling" down to blue (Leximancer, 2017:12,24). It is important to note that the size of the circle of a theme "has no bearing to its prevalence or importance … the circles are merely boundaries" (Leximancer, 2013). The number of concepts within a theme determines its dominance, and the Leximancer interface displays a histogram to the right of the concept map with a synopsis of the themes. Here, the most prevalent themes are also ranked by colour. (Leximancer, 2013).

During Leximancer's dynamic learning process, words of high relevance to a seed word are gathered and accumulate in a thesaurus of terms associated with each concept (Leximancer, 2017:11). The tab for the thesaurus is found above the histogram to the right of the concept map. The thesaurus shows a "ranked list of ... words that define and describe each concept" (Leximancer, 2017:27). When you are in the Concepts tab, one can click on the magnifying lens icon to display text excerpts "where that thesaurus term appears as evidence for a concept of interest" (Leximancer, 2017:27). It is these text excerpts that are used as direct quotes in the discussion of the findings (See Figure 2 below).

Figure 1: Leximancer concept map and theme synopsis histogram

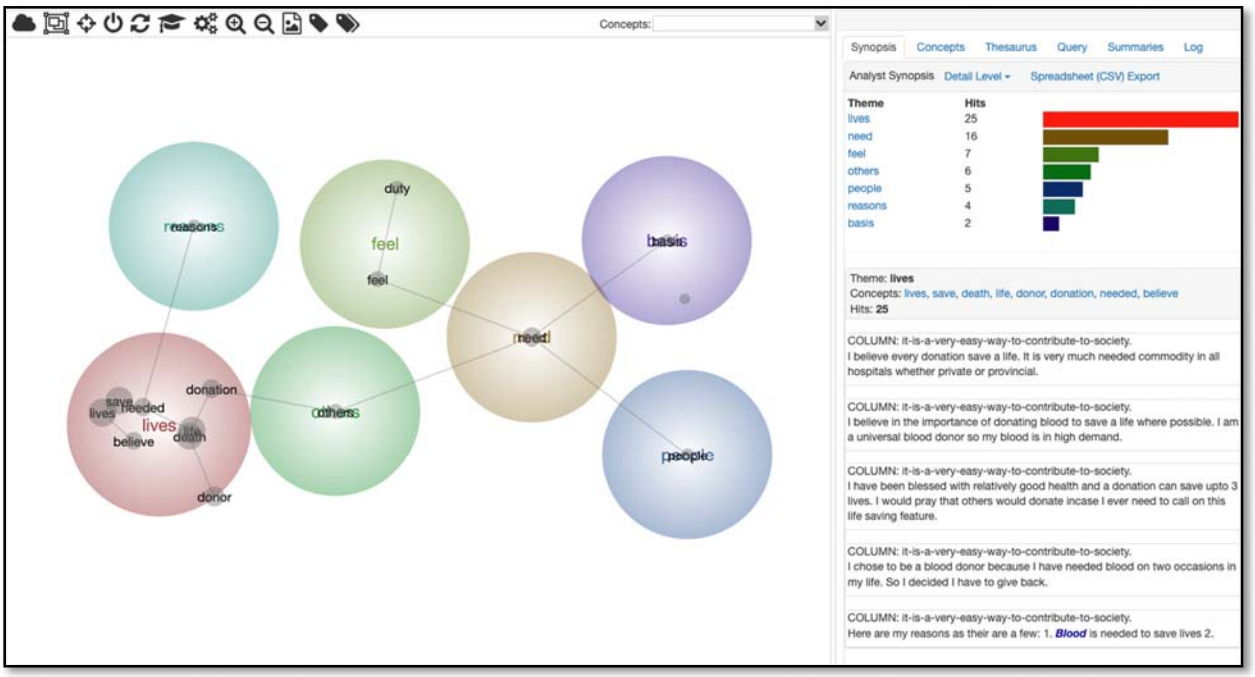
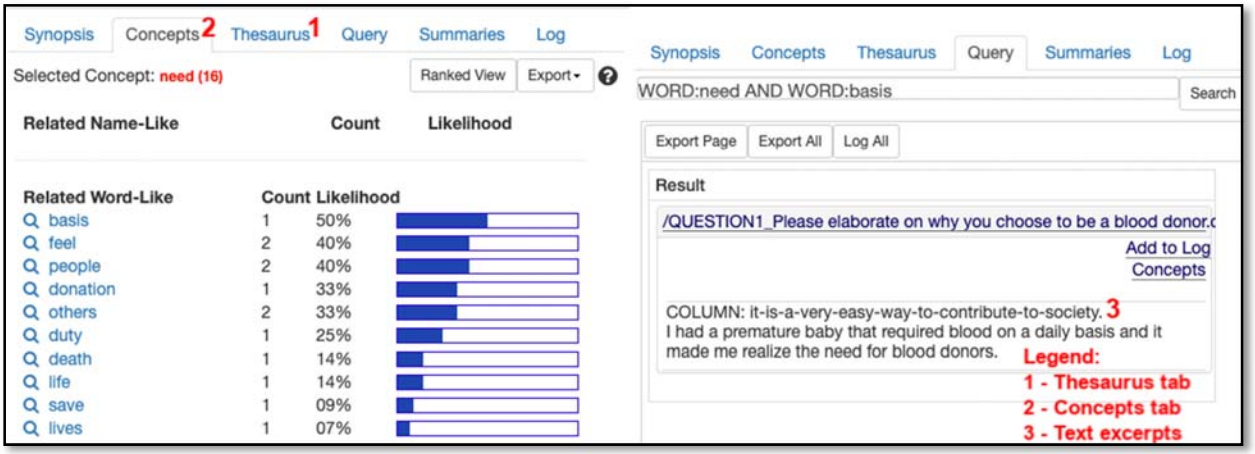


Figure 2: Leximancer thesaurus tab, concepts tab and thesaurus text excerpts



5 Findings: Leximancer concept Analysis

When prompted to elaborate on their motivation for donating blood, respondents asserted that blood donation saved lives. This is evident in the theme of 'lives' appearing most prominently, with its related concepts emerged as 'save', 'lives', 'life', and 'death' (Figure 3). The concepts of 'life' and 'death' specifically appeared closely related, and evidence for this association can be seen in the following text excerpts:

> *"It is used in emergency care and intensive care in life or death situations."*

"My wife almost bled to death during a C-section with the birth of our 3rd child. Her life was saved by great doctors and the fact that there was donor blood available."

Respondents also showed an altruistic consideration for saving lives as a motivator for donating blood. The concepts 'save' and 'lives' were closely related to each other, and showed up multiple times in the text:

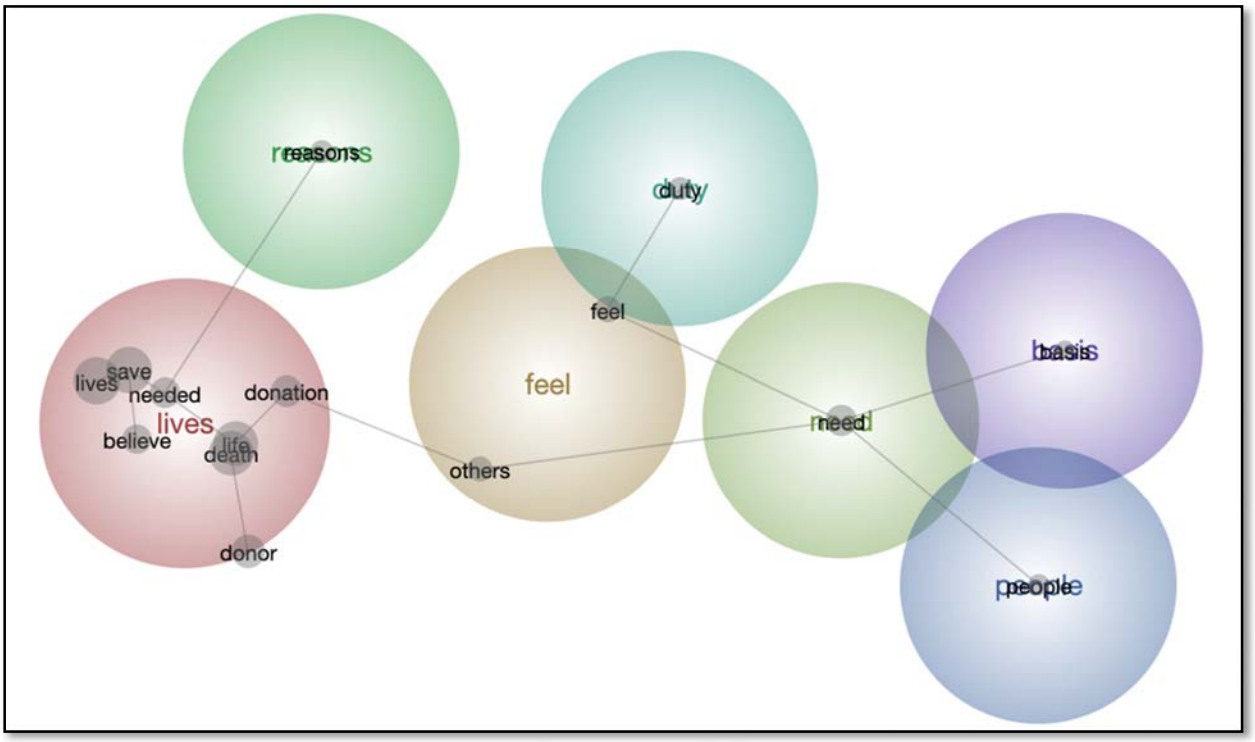
"to make a positive contribution and save lives"

"I believe every donation save a life."

"To help save lives"

"Blood is needed to save lives"

Figure 3: Concept map – Respondents' motivation for donating blood



It was important to establish the motivation of respondents for being active blood donors, to understand how this motivation could translate into app features in a blood donation app. For example, Fergusen and Lawerence (2016:154) found that "[r]eciprocating a gift is central to most models of altruism", and that the recipients of a blood donation would benefit from having a channel through which to "express their gratitude", which could potentially inspire others to donate as well. Muthivhi, Olmsted, Park, Sha, Raju, Mokoena, Bloch, Murphy, and Reddy (2015:256) concurred with this appeal to selflessness, stating that " communications should convey messages that appeal to a sense of altruism, while emphasizing other aspects of blood donation that could motivate potential blood donors." App features promoting information sharing, possibly through social media, could prove valuable in such an endeavor when attempting to attract younger donors (Sümnig, Feig, Greinacher & Thiele, 2018:2259).

When asked whether the ability to track their donation from donating to blood transfusion to a recipient would affect their current blood donation experience and behaviour, respondents were divided. The themes of 'recipient' (most prominent), 'donor', and 'effect' were separate yet related to each other, however the thesaurus excerpts showed that the sentiment was ambivalent across all three themes:

> *"I [don't] need to know the recipient only that the blood is well used"*
>
> *"I think it could be beneficial if your donation is tracked through the system and you can see the benefit/effect of your donation."*
>
> *"I would not want to track my donation to a recipient. I feel that the anonymity of the donor to the recipient is an important part of the blood donation process and this should be kept."*
>
> *"it would be interesting to see where my blood goes and what is does. it will help encourage me to donate more and help more people"*

The idea of tracking a donation from donor to recipient is one adopted by some of the leading mobile blood donation initiatives. The American Red Cross' blood donation app, which launched in 2014, describes its "Blood Journey" feature one of the app's most exciting functionalities (Moore, 2017). News that Swedish blood donors received a text message whenever their blood was used to save a life, made headlines in 2015, with a communications manager for Stockholm's blood centre stating that this was an attempt "to make the public and especially the blood donators understand just how important their contribution is" (Stone, 2015). However, the responses of this interview indicated an indecision towards such a feature, and highlighted an issue that should be explored in the subsequent quantitative survey.

'Time' presented as a major theme when respondents were asked whether the ability to schedule blood donation appointments would affect their current blood donation behaviour. The second most prominent theme, which was also associated with the theme of 'time', was that of 'schedule', which contained the concepts of 'able', 'schedule', and 'appointment'. The thesaurus phrases associated with those concepts were not conclusive regarding the likelihood of a scheduling feature likely increasing blood donations. However, when the next theme, 'easier', was queried queried, it showed a likelihood of encouraging blood donation due to the convenience offered:

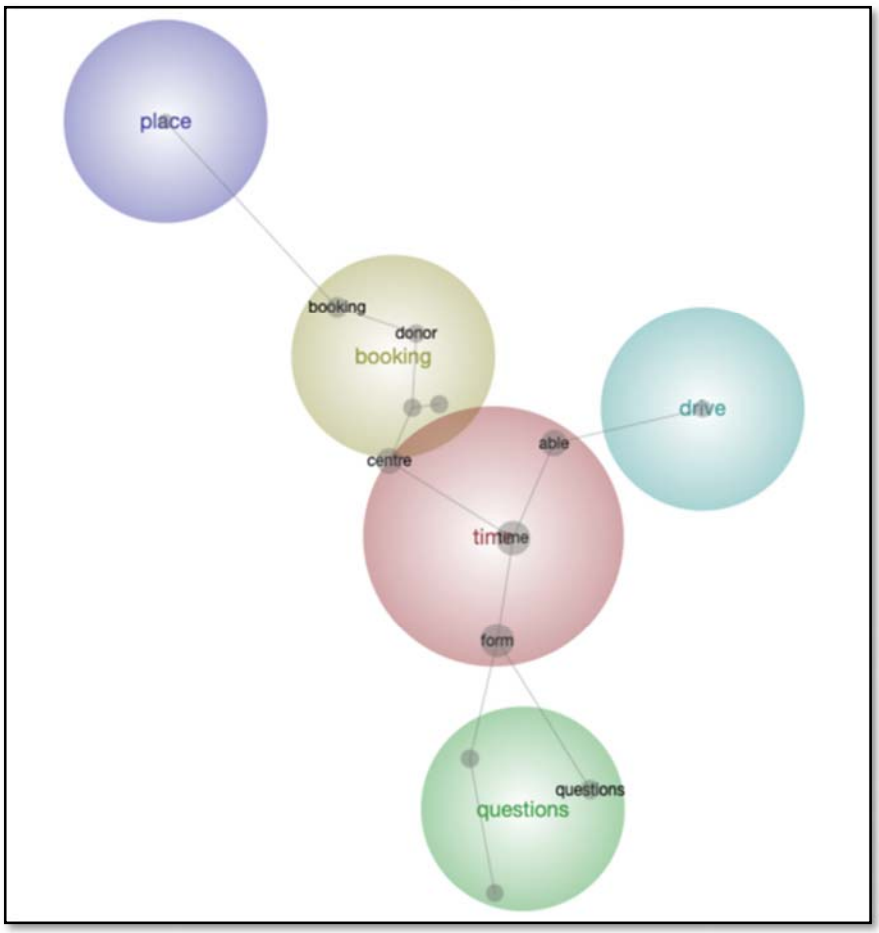
> *"Would make it easier to incorporate into daily routine"*
>
> *"This would make it much easier"*
>
> *"It will make it easier to schedule where and when it suits you"*
>
> *"If I [don't] have to look for a centre and not wait in a queue it would be easier to donate and reduce time wasted"*

The likelihood of a scheduling function being well-received among donors, seems to be noteworthy. Yuan, Chang, Uyeno, Almquist and Wang (2016:620), in their study of mobile application acceptance among blood donors, found that scheduling blood donation appointments, and receiving appointment confirmations quickly, enthused respondents. Bagot, Masser, Starfelt and White (2016:191) also noted that donors agreed in theory with the improvement of the logistics associated with blood donations, specifically those elements that simplified scheduling. The necessity of a scheduling feature was also confirmed by respondents when they were asked what

features specifically would save them time in terms of their current blood donation experience. Figure 4 below shows the most prevalent theme, 'time', closely related with the theme 'booking'. Text from the themes' thesaurus evidence also confirm that respondents felt that the ability to schedule an appointment would save them time, and ensure convenience in terms of specific preferences:

> *"booking the appointments would be great"*
>
> *"It will just help to get to [center] quicker if I am not at my usual place. If it is a busy [center] then a booking will also help."*
>
> *"Preference booking for left or right arm donation chairs"*

Figure 4: Themes and concepts related to time saved through specific app features



The final notable feature that will be discussed in this paper, is the concept of incentives. When respondents were asked whether the possibility of receiving rewards on the app, either in the form of a digital user badge or vouchers and discounts from retailers would motivate an increase in blood donation, the response was resoundingly positive. 'Behaviour' was the most prominent theme that arose from this question, with the concepts 'affect', 'behaviour', and 'influence' indicating a change in behaviour to increased blood donation, should rewards and incentives be offered. The theme

'rewards' was more prominent than the theme 'incentives', and users discussed these concepts as follows:

> *"It would definitely motivate me and others, I am sure. Perhaps consider talking to banks such as FNB to partner with them on their rewards system"*
>
> *"Reinforcement would motivate me"*
>
> *"Receiving rewards is always great"*
>
> *"Incentives such as vouchers would be greatly appreciated as it would reward me for my contribution. I would also be able to motivate to other potential donors such as family members the rewards of donating"*

Chell, Davison, Masser and Jensen (2018:251) concur that certain incentives, "specifically discounts and tickets … gifts, and paid time off work" showed potential for motivating blood donations. In a study among black South Africans, which considered motivation for donating blood, Muthivhi *et. al.* (2015:253) also noted the validity of incentives as motivators for increased blood donation. These assertions, combined with the findings of the interview, are promising in terms of exploring forms of incentives and rewards as features in the conceptual blood donation app.

6 Conclusion

This paper presented the plight of South Africans in terms of a dire need for increased blood supply. A conceptual mobile app was proposed as a possible solution, and the user-preferred features of such an app were determined as the ultimate outcome of the research. This paper reported on the second phase of data collection and analysis in a three-part mixed method, sequential study. The findings presented reported on the views, regarding app features for a mobile blood donation app, of existing and potential South African blood donors.

Findings indicated that the respondents had altruistic intentions when choosing to donate blood, but that incentives and rewards as app features would potentially prove beneficial to the goal of increased blood donation. The ability to schedule blood donation appointments using an app was found to be a potential motivating feature that should be included in the app's features. Surprisingly, the ability to track donations from start to finish was not resoundingly accepted among respondents, and needs to be investigated further before such a feature can be suggested.

The researchers used the findings of this qualitative study to inform the creation of a quantitative survey, which aimed at further refining the user-preferred list of features for a mobile blood donation app in the South African context.

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APPENDIX 1 – INTERVIEW SCHEDULE

Section A: Blood donation profile

1. Are you an existing blood donor?
   Yes/No *[if 'Yes', proceed with question 4; if 'No', proceed with question 2]*
2. If you answered 'no' to being an existing blood donor, please note the basic requirements for being a blood donor below. Are you unable to donate blood because you do not meet some or any of these requirements?
   Yes, there are certain requirements that I do not meet /No, I meet all the requirements to be a blood donor
   [If 'Yes', end of interview; if 'No', proceed with question 3]
   Basic requirements for being a blood donor:
   - *You should be between the ages of 16 and 65 years old.*
   - *You should weigh a minimum of 50kg.*
   - *You should be in good health.*
   - *You should lead a low risk lifestyle.*
   - *You consider your blood safe for transfusion.*
   - *You can have a balanced meal within four hours of donating blood.*
   - *Your pulse is between 50-100 regular beats per minute.*
   - *Your blood pressure is below 180 systolic (first number) and below 100 diastolic (second number) (180/100mmHg) and above 100 systolic (first number) and above 60 diastolic (second number) (100/60mmHg).*
   - *Your haemoglobin level is 12.5 g/dL or above.*
3. If you are eligible to donate blood, but do not donate blood, please elaborate on why you do not donate blood. *[Once answered, proceed with question 6]*
4. If you answered 'yes', please elaborate on why you choose to be a blood donor. *[Once answered, proceed with 5]*
5. If you answered 'yes' how often do you donate blood? *(Pick one) [Once answered, proceed with question 6]*
   - *Every 8 weeks (approximately every 56 days)*
   - *When I am contacted by the blood donation organisation*
   - *When I see a blood donation stall/centre and I have time*
   - *When I hear reports that there is a dire shortage of blood in the country*
   - *When I know I will get a gift or reward for donating blood*
   - *Other: [Type other notable apps, separated by a comma]*
6. Do you own an Internet enabled "smart device" such as a smartphone* or tablet?
   Yes/No *[If 'Yes', proceed with remainder of interview; If 'No', end of interview]*
   **A smart device is a mobile device that can browse the Web and run applications (apps).*
7. Which apps do you regularly use on your smartphone or tablet? Please select all that apply.
   - *WhatsApp*
   - *Facebook*
   - *Facebook Messenger*
   - *Instagram*
   - *Twitter*
   - *Uber*
   - *A mobile gaming app (such as Clash of Clans, Design Home, or any other)*
   - *A file transfer app (such as SHAREit)*
   - *An online shopping app (such as Wish, Takealot, or any other)*
   - *A Web browser (such as Opera Mini, Google Chrome, or any other)*
   - *A banking app*
   - *A news app (such as News24, or any other)*
   - *A GPS navigation app (such as Waze, Google Maps, or any other)*
   - *Other: [Type other notable apps, separated by a comma]*
8. Please select your age: *[drop down menu; 16 - 65]*
9. Please select your gender: *[drop down menu; male, female]*
10. Please select your race: *[drop down menu; Asian, Black, Coloured, Indian, White]*

Section B: Preferences for mobile blood donation app features

The conceptual app that is relevant to this research study, will be aimed at assisting blood donation organisations in increasing interaction with existing and potential blood donors. The goal of this app will be to raise awareness around issues concerning blood donation, especially the need for blood donations in South Africa, to ultimately attempt at stimulating an increase in blood donation in the country. The leading international app of this kind, has the following features:

- Users can find local blood drives and donation centres quickly and easily;
- Users can schedule and reschedule blood donation appointments;
- Users will receive appointment reminders;
- Users can keep track of total blood donations;
- Users will receive special blood shortage alert messages;
- Users can claim rewards from participating retailers for donating blood;
- Users can join or create a "lifesaving team", to recruit other blood donors and view rankings on the "Blood Donor Teams Leader Board";
- Users can rate their blood donation experience;
- Users can follow their blood donation journey from donation through delivery, when available.

Open-ended Questions:

Please write between 150 and 300 words per answer.

11. In your opinion, do you think an app such as the one suggested, will facilitate an increase in blood donations among existing and potential blood donors in South Africa. Please elaborate on your answer.

12. The conceptual app would allow you to track your blood donation history *and* would supply you with information about blood donation issues. Please explain if and how such features would influence your blood donation experience and behaviour.

13. What would you expect from an app (and its development team) in terms of support if you were to experience technical difficulties within the app? (Example: You cannot access certain features; or the app freezes).

14. In what ways, if any, the ability to schedule blood donation appointments affect your current blood donation behaviour?

15. How could the ability to find blood drives or donation centre locations through a map feature on the app, affect your current blood donation behaviour?

16. What features should an app such as this have, to save you time in terms of your current blood donation experience?

17. How could the ability to track your blood from your donation to the recipient, through the app, affect your current blood donation experience and behaviour?

18. How could the possibility of receiving rewards on the app (e.g. an elite user badge) or incentives through the app (such as vouchers or discounts at retailers) affect your current blood donation behaviour?

19. By donating blood, you can save a life. Please elaborate on your perception on whether, and in which ways, an app such as the one that is suggested, could aid in saving someone's life.

20. Please select three of the features listed above, that would facilitate a positive change in terms of blood donation frequency in South Africa, in your opinion. Please elaborate on your answer. Also, feel free to include features that were not mentioned in the interview.